IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Akiho OTA et al. Group Art Unit: 1772

Serial No.: 09/720,488 Examiner: B. EGAN

Filed: March 5, 2001 Docket No.: 108259

For: LAMINATED PLASTIC MOLDED BODY

DECLARATION UNDER RULE 132

I, Masato Suzuki, declare that:

I am one of the joint inventors of the above-referenced United States Patent Application Serial No. 09/720,488.

I obtained a bachelor's degree from Toyo University in March 1978, where I majored applied chemistry. Since 1978, I have been employed by YOSHINO KOGYOSHO CO., LTD., the assignee of the above-referenced United States Patent Application, where I have been engaged mainly in the research and development of various polymer materials.

I am familiar with the prosecution history of the above-referenced application.

In order to demonstrate technical advantages obtained by specific proportion ranges of resins A and B as recited in claim 1, I have conducted experiments and measurements as follows:

Concretely, containers having various weight ratios of resin A and B were made. Then with respect to the containers the oxygen

transmission amounts and water vapor transmission amounts were measured and from the data the oxygen permeability coefficients and water vapor permeability coefficients were obtained.

Experiment

Formation of bottles

A polyethylene terephthalate resin RT-543SR available from Nippon Unipet Co., Ltd. was used as a resin for forming a resin layer A, and a polyolefin type resin APEL available from Mitsui Kagaku Co., Ltd., comprising a copolymer of a cyclic olefin component which is tetracyclo[4.4.0.$1^{2,5}$.$1^{7,10}$]-3-dodecene or a derivative thereof and an α-olefin was used as a resin for forming a resin layer B, a parison having a bottom comprising a five-layered structure of a resin layer A (first layer)-a resin layer B (second layer)-a resin layer A (third layer)-a resin layer B (fourth layer)-a resin layer A (fifth layer) with a length of 60 mm (including a bottle-neck portion) and a weight of 13.1 g (Resin A: 11.53 g, Resin B: 1.57 g) was prepared by injection molding.

Incidentally, an injection molding temperature of the resin A was made 290°C and an injection molding temperature of the resin B was made 220°C to 240°C, layer thickness of the first layer, the third layer and the fifth layer were made equal and layer thickness of the second layer and the fourth layer were made equal, respectively.

Then, the above-mentioned parison having a bottom was subjected to biaxial drawing blow molding in a mold for blow molding to obtain a container comprising a multi-layer laminated plastic molded body corresponding to No. 5 standard bottle having a volume of 50 ml.

Measurement of oxygen transmission amounts

Oxygen transmission amounts (cc/day·Bottle) of the respective plastic containers obtained in the above were measured by each setting the atmosphere at the outside said plastic containers to 23°C and 55%RH and the atmosphere in the respective plastic containers to 23°C and 100%RH. From the obtained oxygen transmission amounts the oxygen transmission coefficients ($cc \cdot mm/m^2 \cdot day \cdot atm$) were calculated.

The results are shown in the attached Fig. 1 (Line A) and four data of the results are shown in Table 1.

Measurement of water vapor transmission amounts

Water vapor transmission amounts (g) of the respective plastic containers obtained in the above were measured by filling calcium carbonate for measuring water content in the respective containers under atmosphere of 40°C and 75%RH. Then the water vapor permeability coefficient was calculated.

The results are shown in the attached copy of Fig. 1 of the application (Line B) and four data of the results are shown in Table 1.

Table 1

B wt%	Oxygen permeability coefficient cc·mm/m^2·day·atm	Water vapor permeability coefficient g·mm/m^2·day·atm	Remarks
0	2.5	5.77	Corresponds to Comparative example 2
12	3.2	2.23	Corresponds to Example 2
19	4.2	1.1	Corresponds to Example 3
100	18.8	0.58*	Corresponds to Comparative example 3

* Calculated according to experiment 2 of Comparative example 2 (page 11 of the application).

Evaluation

As shown in Fig. 1, the water vapor permeability coefficient linearly decreases up to 20% by weight of the resin B and after the point the coefficient depicts a naturalized logarithm like curve. Therefore, it is found that the addition of up to 45% by weight of the resin B largely contributes the water barrier effect.

On the other hand, oxygen permeability coefficient almost linearly decreases as the weight ratio of PET increases.

Therefore, it is found that the range of 5% - 45% by weight of the resin B is preferably balanced between Oxygen barrier and water barrier, and the more preferable range is 10% - 25% by weight of the resin B.

Conclusively, in the range of weight ratios mentioned above the oxygen barrier property is maintained and at the same time the water barrier property can be improved.

Therefore, I believe that unexpected technical advantages are obtained in the specific range of the weight ratios defined in claim 1, and the specific range and the effect derived therefrom are neither taught nor suggested by the cited references.

I declare further that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: March 8, 2004 Declarant: Masato Suzuki

Masato Suzuki

FIG. 1